

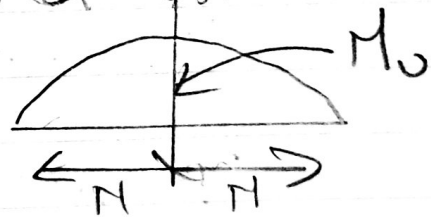
W16x26
 $f'_c = 4000$ psi

10' - 0" AC. Beam
 30' - 0" SPAN

$b_{eff} \leq \text{SPACING} = 10' - 0"$
 $L/4 = 30' - 0" / 4 = \underline{7.5'}$ GOVERNS.
 SLAB EDGE

CHECK SHEAR STRENGTH:

1 STUD/FT \times 30 FT = 30 TOTAL STUDS
BUT, USE ONLY HALF SINCE



15 STUDS

$$Q_n = 17.2^k \quad \Sigma Q_n = 15 \times 17.2 = 258^k$$

$$a = \frac{\Sigma Q_n}{0.85 f'_c b_{eff}} = \frac{258}{0.85(4)(10)} = 0.94"$$

TOTAL

ENTER TABLE 319

$$y_2 = 6.25 - 0.94/a = 5.75$$

$$x_{Gn} = \underline{\underline{258}}$$

INTERPOLATE VALUES -

$$\left(\frac{345 - 324}{289 - 242} \right) (258 - 242) + 324$$

$$\Rightarrow \underline{331}$$

$$\left(\frac{356 - 333}{289 - 242} \right) (258 - 242) + 333 = \underline{340}$$

5.75 LAYS IN BETWEEN

$$A_n = \frac{340 + 331}{2} = \boxed{335 \text{ kg}}$$

OR USE METHOD FROM EX 2.

$$Y_{ENA} = \frac{A_s d_3 + \left(\sum Q_n / F_y \right) (2d_3 + d_1)}{A_s + \left(\sum Q_n / F_y \right)}$$

$$= \frac{7.68 \left(\frac{15.9}{2} \right) + \left(\frac{258}{50} \right) (15.9 + 62.5 - 0.94/2)}{7.68 + (258/50)}$$

$$= 172 / 12.84 = 13.4"$$

$$I_{LB} = I_s + A_s (Y_{ENA} - d_3)^2 + \left(\sum Q_n / F_y \right) (2d_3 + d_1 - Y_{ENA})^2$$

$$I_{LB} = 301 + 7.68 (13.4 - 15.9/2)^2 + \left(\frac{258}{50} \right) (15.9 + 62.5 - 0.94/2 - 13.4)^2$$

$$301 + 228 + 354 = \underline{\underline{883 \text{ in}^4}}$$

CHECK DEFL

$$SELF = 60 \text{ PSF} + 8 \text{ PSF} = 68 \text{ PSF}$$

$$DECK COMP = 15 \text{ PSF}$$

$$LL = 40 \text{ PSF NR.}$$

CH

$$\Delta_{\text{INITIAL}} = \frac{5wL^4}{384EI_{\text{STEEL}}}$$

$$= \frac{5(68 \times 10')(30)^4 \times 12^3}{384E \times 301} = 1.42''$$

CAMBER 80% = 1.13" \Rightarrow ROUND DOWN TO 1"

POST COMPOSITE DEFLECTION:

$$\Delta_{\text{POST}} = \frac{5(15+40)(10')(30)^4 \times 12^3}{384E(I_{\text{COMP}} = 883 \text{ in}^4)} = 0.39''$$

TOTAL DEFL:

$$1.42'' - 1'' + 0.39'' = 0.81''$$

$$L/240 = 360''/240 = 1.5'' \Rightarrow \text{BEAM OK}$$

$$\Delta_{\text{LL}} = 0.39 \times \frac{40}{(15+40)} = 0.28''$$

$$L/360 = 360''/360 = 1'' \Rightarrow \text{BEAM OK}$$